In[1]:=
```
(* Zadatak 0: x''=const *)
DSolve[{x''[t] == a, x'[0] == v0, x[0] == 0}, x[t], t]
```

Out[1]=
$$\left\{\left\{x[t] \to \frac{1}{2}\left(a\,t^2 + 2\,t\,v0\right)\right\}\right\}$$

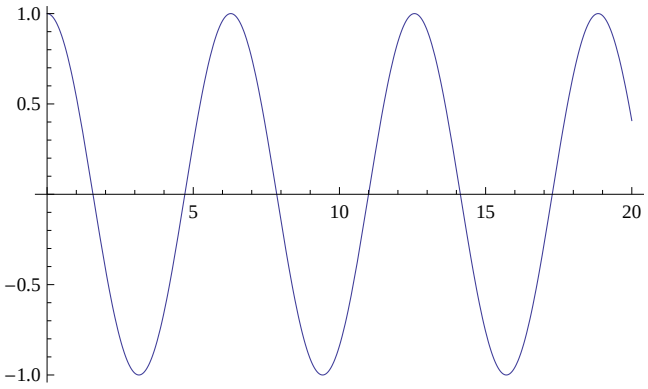
In[2]:=
```
(* Zadatak 1: Harmonijske oscilacije *)
resenje = DSolve[{x''[t] + ω^2 x[t] == 0, x'[0] == 0, x[0] == x0}, x[t], t]
```

Out[2]=
$$\{\{x[t] \to x0\,\text{Cos}[t\,\omega]\}\}$$

In[3]:=
```
r[t_] := x[t] /. resenje[[1]]
```

In[4]:=
```
Plot[r[t] /. {ω → 1, x0 → 1}, {t, 0, 20}]
```

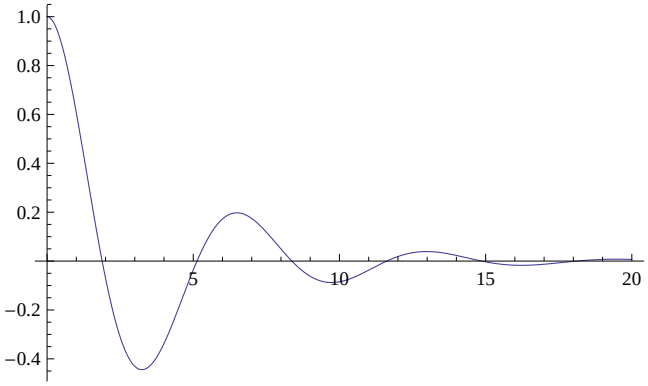
Out[4]=



In[5]:=
```
(* Zadatak 2: Prigusene oscilacije *)
resenje = DSolve[{x''[t] + ω^2 x[t] + γ x'[t] == 0, x'[0] == 0, x[0] == x0}, x[t], t]
r[t_] := x[t] /. resenje[[1]]
Plot[r[t] /. {ω → 1, x0 → 1, γ → 0.5}, {t, 0, 20}, PlotRange → All]
```

Out[5]=
$$\left\{\left\{x[t] \to \frac{1}{2\sqrt{\gamma^2 - 4\,\omega^2}}\right.\right.$$
$$\left.\left.x0\left(-e^{\frac{1}{2}t\left(-\gamma-\sqrt{\gamma^2-4\,\omega^2}\right)}\gamma + e^{\frac{1}{2}t\left(-\gamma+\sqrt{\gamma^2-4\,\omega^2}\right)}\gamma + e^{\frac{1}{2}t\left(-\gamma-\sqrt{\gamma^2-4\,\omega^2}\right)}\sqrt{\gamma^2 - 4\,\omega^2} + e^{\frac{1}{2}t\left(-\gamma+\sqrt{\gamma^2-4\,\omega^2}\right)}\sqrt{\gamma^2 - 4\,\omega^2}\right)\right\}\right\}$$

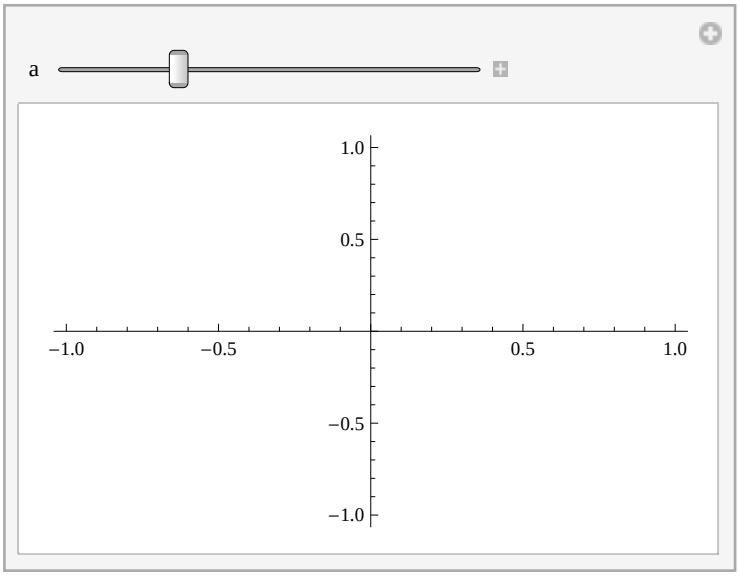
Out[7]=



In[8]:=
```
resenje = DSolve[{x''[t] + ω^2 x[t] + γ x'[t] == 0, x'[0] == 0, x[0] == x0}, x[t], t]
r[t_] := x[t] /. resenje[[1]]
Manipulate[Plot[r[t] /. {ω → 1, x0 → 1, γ → a}, {t, 0, 20}, PlotRange → All], {a, 0, 1.9, 0.1}]
```

Out[8]=
$$\left\{\left\{x[t] \to \frac{1}{2\sqrt{\gamma^2 - 4\omega^2}}\right.\right.$$
$$x0\left(-e^{\frac{1}{2}t\left(-\gamma-\sqrt{\gamma^2-4\omega^2}\right)}\gamma + e^{\frac{1}{2}t\left(-\gamma+\sqrt{\gamma^2-4\omega^2}\right)}\gamma + e^{\frac{1}{2}t\left(-\gamma-\sqrt{\gamma^2-4\omega^2}\right)}\sqrt{\gamma^2 - 4\omega^2} + e^{\frac{1}{2}t\left(-\gamma+\sqrt{\gamma^2-4\omega^2}\right)}\sqrt{\gamma^2 - 4\omega^2}\right)\left.\right\}\}$$

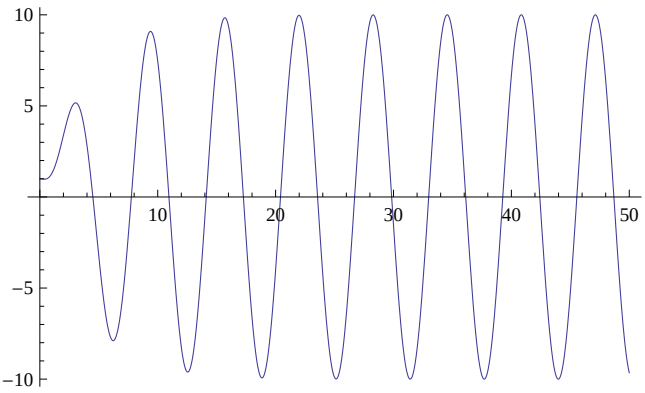
Out[10]=



In[26]:=
```
(* Zadatak 3: Prinudne oscilacije i rezonantna kriva *)
resenje = DSolve[{x''[t] + ω^2 x[t] + γ x'[t] == a0 Sin[ωp t], x'[0] == 0, x[0] == x0}, x[t], t];
r[t_] := x[t] /. resenje[[1]]
```

In[28]:=
```
Plot[r[t] /. {ω → 1, x0 → 1, γ → 0.5, a0 → 5, ωp → 1}, {t, 0, 50}]
```

Out[28]=



```
Manipulate[Plot[r[t] /. {ω → 1, x0 → 1, γ → 0.5, a0 → 5, ωp → p}, {t, 0, 50}], {p, 0.1, 3}]
```

Out[31]=